

Ka-band Doppler Scatterometer for Measurements of Ocean Vector Winds and Surface Currents (DopplerScatt)

Completed Technology Project (2014 - 2017)



Project Introduction

Ocean surface currents impact heat transport, surface momentum and gas fluxes, ocean productivity and marine biological communities. Ocean currents also have social impacts on shipping and disaster management (e.g., oil spills). There is an intrinsic two-way coupling between ocean currents and surface winds and concurrent measurements of the two enable the understanding of the relevant air-sea interaction. The ability to simultaneously measure winds and currents improves the accuracy of both individual measurements. To date, measurements of ocean surface currents and winds have not been made simultaneously. Currently there are no planned global direct measurements of ocean surface currents and winds (SWOT and altimeters measure geostrophic components of ocean currents). We propose to build the first demonstrator instrument of the new measurement technique capable of measuring both currents and winds using a compact radar instrument that will be developed in this project. The instrument is a spinning Ka-band pencil-beam Doppler scatterometer system (DopplerScatt). The proposed development will demonstrate measurements that can be scaled to wide swath spaceborne observations using a single cost-effective instrument. The proposed work will be divided into three major tasks: 1) design and build of the radar for a spinning antenna configuration, closed-loop calibration and a digital back-end system for on-board processing, 2) end-to-end system test and integration on the airborne platform and 3) demonstration of achievable accuracy for joint vector wind and current retrieval through a designed airborne experiment. The last year of the proposed 3-year duration will be used for instrument integration and testing, aircraft installation and engineering flights. The details of the work plan and cost assumptions are provided in Section 6. The entry TRL for DopplerScatt will be 3 while the exit TRL will be 6 upon completion of the engineering checkout and validation flights.



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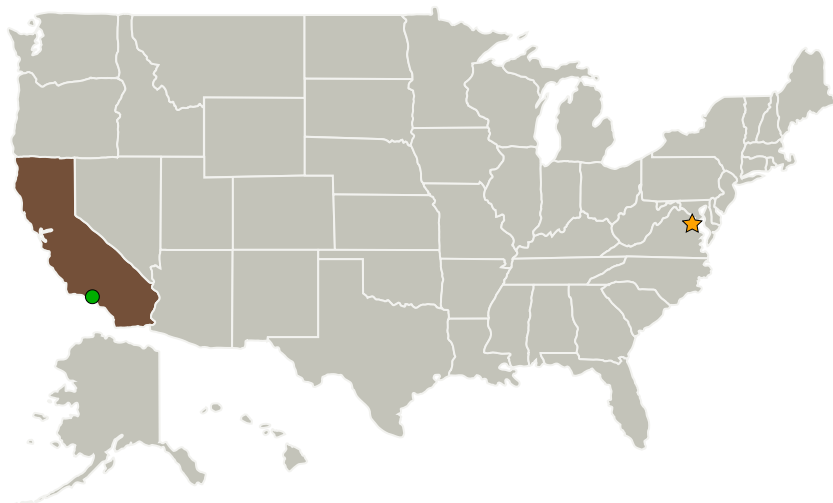
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Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
★ NASA Headquarters(HQ)	Lead Organization	NASA Center	Washington, District of Columbia
● Jet Propulsion Laboratory(JPL)	Supporting Organization	NASA Center	Pasadena, California

Primary U.S. Work Locations

California

Organizational Responsibility

Responsible Mission Directorate:

Science Mission Directorate (SMD)

Lead Center / Facility:

NASA Headquarters (HQ)

Responsible Program:

Instrument Incubator

Project Management

Program Director:

Pamela S Millar

Program Manager:

Parminder S Ghuman

Principal Investigator:

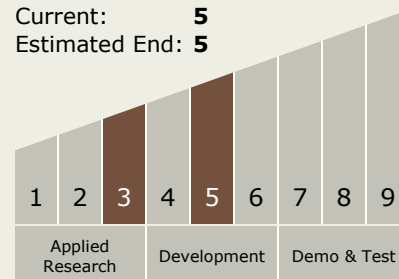
Dragana Perkovic-martin

Co-Investigator:

Karen R Piggee

Technology Maturity (TRL)

Start: 3
Current: 5
Estimated End: 5



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Images



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(<https://techport.nasa.gov/image/5131>)

Technology Areas

Primary:

- TX08 Sensors and Instruments
 - └ TX08.1 Remote Sensing Instruments/Sensors
 - └ TX08.1.4 Microwave, Millimeter-, and Submillimeter-Waves

Target Destination

Earth